

REMARKS

Claims 1-37 are pending. Claims 16, 19, 22-23, 34, and 37 are rejected under 35 U.S.C. § 102(b). Claims 1-9, 20-21, 24-26, and 33 are rejected under 35 U.S.C. § 103(a). Claims 10-15, 17-18, 27-32, 35, and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims.

Independent claims 16 and 34 are rejected under 35 U.S.C. § 102(b) as being anticipated by Robertson et al., *Bandwidth-Efficient Turbo Trellis-Coded Modulation Using Punctured Component Codes*, IEEE Journal on Selected Areas in Communication, Vol. 16, No. 2., 206 (Feb. 1998). Robertson et al. disclose at Figure 1 an encoder that is similar to applicants' admitted prior art at Figure 2. Applicants have indicated that the mapping function 26 for upper and lower branches of the encoder of Figure 2 are identical. (page 4, line 21 through page 5, line 1). This is consistent with the disclosure of Robertson et al. Specifically, Figures 1, 2, 4, and 5 of Robertson et al. disclose identical mapping functions for both branches of their encoders. Applicants fail to find any teaching or suggestion by Robertson et al. that mapping functions of upper and lower branches of an encoder of the prior art might be different.

By way of contrast, applicants disclose high quality data communication can be advantageously achieved by an asymmetric PCTM system including two component trellis code branches which utilize different coded bits-to-signal mappings. (page 7, lines 6-10). Independent claim 16, for example, recites "a first mapper coupled to said first coder for applying a first coded bits-to-signal mapping to said coded bits to produce a first output signal; and a second mapper coupled to said second coder for applying a second coded bits-to-signal mapping to the interleaved version of said coded bits to produce a second output signal, *wherein said second coded bits-to-signal mapping differs from said first coded bits-to-signal mapping.*" (emphasis added). Examiner states "Robertson fig. 1: top and bottom mappers are different at least because of different inputs." (Office Action dated 3/10/05, page 3, paragraph 3). Applicants respectfully

disagree. Claim 16 is directed to different first and second bits-to-signal mapping functions as shown at Figure 9 and described at page 10, lines 5-15 of the present invention. The bits-to-signal mapping function does not change with different input signals as Examiner suggests. Thus, claim 16 and depending claims 19 and 22-23 are patentable under 35 U.S.C. § 102(b) over Robertson et al.

Independent claim 34 recites "applying a first coded bits-to-signal mapping to said coded bits to produce a first output signal; and applying a second coded bits-to-signal mapping to the interleaved version of said coded bits to produce a second output signal, *wherein said second coded bits-to-signal mapping differs from said first coded bits-to-signal mapping.*" As previously discussed, Robertson et al. fail to disclose this novel feature of the claimed invention. Thus, claim 34 and depending claim 37 are also patentable under 35 U.S.C. § 102(b) over Robertson et al.

Independent claims 1 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Robertson et al. in view of Wei (U.S. Pat. No. 6,473,878). Claim 1 recites "a first mapper coupled to said first input for applying a first coded bits-to-signal mapping to said coded bits to produce a first output signal; a second mapper coupled to said second input for applying a second coded bits-to-signal mapping to the interleaved version of said coded bits to produce a second output signal, *wherein said second coded bits-to-signal mapping differs from said first coded bits-to-signal mapping.*" Claim 25 recites "applying a first coded bits-to-signal mapping to said coded bits to produce a first output signal; applying a second coded bits-to-signal mapping to the interleaved version of said coded bits to produce a second output signal, *wherein said second coded bits-to-signal mapping differs from said first coded bits-to-signal mapping.*" (emphasis added). Examiner relies on Robertson et al. for the emphasized limitations.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (MPEP § 2143). Applicant respectfully submits that Examiner has failed to establish all three criteria. Thus, claims 1-9, 25-26, and 33 are patentable under 35 U.S.C. § 103(a) over Robertson et al. in view of Wei.

Examiner states "Robertson suggests to compare different mapping schemes (as in Robertson's fig. 6 and pg 215) to see which one has a better error rate given the same signal to noise ratio and this comparison can be performed by having the top and bottom signal mappers have different mappings and then evaluation the output in the analogous art of mapping." Applicants respectfully submit that these are Examiner's words based on improper hindsight and not the disclosure of Robertson et al. Examiner fails to offer any rationale for modifying the disclosure of Robertson et al. Moreover, Robertson et al. fail to teach or suggest that different mapping functions might be used in upper and lower branches of an encoder and specifically teaches that they should be the same at Figures 1, 2, 4, and 5. A statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) (Court reversed obviousness rejection involving technologically simple concept because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention); *AI-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do

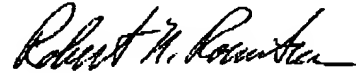
so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Here, there is no teaching or suggestion to combine Robertson et al. with Examiner's *ipse dixit* apart from improper hindsight in view of the instant specification. Thus, claims 1-9, 25-26, and 33 are patentable under 35 U.S.C. § 103(a).

Moreover, Examiner's proposed modification of Robertson et al. with different mapping functions in a single encoder must have a reasonable expectation of success. Neither Robertson et al. nor Examiner offer any reason to believe such a modification might work. Robertson et al. specifically teach away from such a modification by disclosing exactly the same mapping functions for upper and lower branches of disclosed encoders at Figures 1, 2, 4, and 5. Thus, Examiner's proposed modification would offer no reasonable expectation of success to one of ordinary skill in the art at the time of the invention.

Finally, Examiner's proposed combination of Robertson et al. with Wei fails to teach or suggest all the claim limitations. As previously discussed, the cited references, taken alone or in combination, fail to disclose different mapping functions for the apparatus of claim 1 or the method of claim 25. For all the foregoing reasons, therefore, claims 1-9, 25-26, and 33 are patentable under 35 U.S.C. § 103(a).

In view of the foregoing, applicant respectfully requests reconsideration and allowance of claims 1-37. If the Examiner finds any issue that is unresolved, please call applicants' attorney by dialing the telephone number printed below.

Respectfully submitted,



Robert N. Rountree
Attorney for Applicants
Reg. No. 39,347

Robert N. Rountree, LLC
70360 Highway 69
Cotopaxi, CO 81223
Phone/Fax: (719) 783-0990